Amendments to the Claims:

Please cancel Claims 2 – 4 and amend Claim 1 as indicated in the following listing of claims, which replaces all prior versions and listings of claims in the application.

Listing of Claims:

1. (Currently Amended) A composite structure comprising:

a nonelastomer substrate having a surface bearing a first recess extending along a length within the nonelastomer substrate to permit fluid flow along the length;

an elastomeric layer overlying the nonelastomer substrate and bearing a second recess, the elastomeric layer including a flexible elastomer membrane ~~overlying the non-elastomer substrate~~ that forms a ceiling of the first recess, the membrane able to be actuated into the first recess to control a flow rate of the fluid flow along the length in response to a variation in pressure in the second recess; and

~~a layer overlying the flexible elastomer membrane~~.

2. – 4. (Canceled).

5. (Original) The composite structure of claim 1 wherein the first recess comprises a channel.

6. (Withdrawn) A composite structure comprising:

an elastomer component including at least one of a recess and a flexible membrane portion; and

a substantially planar nonelastomer component sealed against the elastomer component, the nonelastomer component including an active device interacting with at least one of the membrane portion and a material present in the recess.

7. (Withdrawn) The composite structure of claim 6 wherein the active device is an optical structure selected from the group consisting of a photodiode, a fiber optic device, a fiber optic interconnect, a light emitting diode, a laser diode, vertical cavity surface emitting laser (VCSEL), a micromirror, a CMOS imaging array, a CCD camera, a waveguide, and a source or a receiver for visible, infrared, or ultraviolet regions of the electromagnetic spectrum.

8. (Withdrawn) The composite structure of claim 6 wherein the active device is an electronic structure selected from the group consisting of a resistor, a capacitor, a transistor, a chemical field effect transistor, a amperometric/coulometric electrochemical sensor, an accelerometer, a pressure sensor, a flow sensor, an electronic logic structure, a microprocessor, a chemical sensor, a strain gauge, an inductor, an actuator, a coil, a magnet, an electromagnet, a magnetic sensor, a radio frequency source, a radio frequency receiver, a microwave frequency source, a microwave frequency receiver, a radioactive particle counter, and an electrometer.

9. (Withdrawn) The composite structure of claim 6 wherein the active device is a thermal structure selected from the group consisting of a thermistor, a Peltier cooler, and a resistive heater.

10. (Withdrawn) The composite structure of claim 6 wherein the active device is an electrode that electrostatically drives the membrane portion into the recess.

11. (Withdrawn) A method of fabricating a composite structure comprising:

forming a recess in an elastomer component;

forming a substantially planar nonelastomer component including an active device; and

sealing the elastomer component against the nonelastomer component, such that the active device may interact with at least one of a flexible membrane portion of the elastomer component and a material present within the recess.

12. (Withdrawn) The method of claim 11 wherein the elastomer component is sealed against the elastomeric component by formation of a Van der Waals chemical bond.

13. (Withdrawn) The method of claim 11 wherein the elastomer component is placed against the non-elastomeric component with a liquid layer, and the liquid layer is then removed.

14. (Withdrawn) The method of claim 11 wherein the elastomer component is sealed against the nonelastomer component by formation of a covalent chemical bond.

15. (Withdrawn) The method of claim 11 wherein the elastomer component is sealed against the nonelastomer component by formation of an ionic chemical bond.

16. (Withdrawn) The method of claim 11 wherein the active device formed in the nonelastomer component is an optical structure selected from the group consisting of a photodiode, a fiber optic device, a fiber optic interconnect, a light emitting diode, a laser diode, vertical cavity surface emitting laser (VCSEL), a micromirror, a CMOS imaging array, a CCD camera, a waveguide, and a source or a receiver for visible, infrared, or ultraviolet regions of the electromagnetic spectrum.

17. (Withdrawn) The method of claim 11 wherein the active device formed in the nonelastomer component is an electronic structure selected from the group consisting of a resistor, a capacitor, a transistor, a chemical field effect transistor, a amperometric/coulometric electrochemical sensor, an accelerometer, a pressure sensor, a flow sensor, an electronic logic structure, a microprocessor, a chemical sensor, a strain gauge, an inductor, an actuator, a coil, a magnet, an electromagnet, a magnetic sensor, a radio frequency source, a radio frequency receiver, a microwave frequency source, a microwave frequency receiver, a radioactive particle counter, and an electrometer.

18. (Withdrawn) The method of claim 11 wherein the active device formed in the nonelastomeric component is a thermal structure selected from the group consisting of a thermistor, a Peltier cooler, and a resistive heater.

19. (Withdrawn) The method of claim 11 wherein the active device is formed in the nonelastomeric component by a technique selected from the group consisting of PCB technology, CMOS, surface micromachining, bulk micromachining, printable polymer electronics, Thin Film Transistor, and other amorphous/polycrystalline material techniques.

20. (Withdrawn) A method of microfabricating an elastomeric structure, the method comprising:

microfabricating a first elastomeric layer including a recess-bearing face and a non-recess-bearing face;

microfabricating a second elastomeric layer including a recess-bearing face and a non-recess-bearing face;

placing the first elastomeric layer against the second elastomeric layer; and

bonding the first elastomeric layer to the second elastomeric layer.

21. (Withdrawn) The method of claim 20 wherein the recess-bearing face of the second elastomeric layer is placed against the non-recess-bearing face of the first elastomeric layer.

22. (Withdrawn) The method of claim 20 wherein the recess-bearing face of the second elastomeric layer is placed against the recess-bearing face of the first elastomeric layer.

23. (Withdrawn) The method of claim 20 wherein the non-recess-bearing face of the second elastomeric layer is placed against the non-recess-bearing face of the first elastomeric layer.

24. (Withdrawn) A method of forming a composite structure comprising:

forming a recess in a first nonelastomer substrate;

filling the recess with a sacrificial material;

forming a thin coat of elastomer material over the nonelastomer substrate and the filled recess;

curing the elastomer to form a thin membrane; and

removing the sacrificial material.

25. (Withdrawn) The method of claim 24 further comprising forming a further elastomer structure over the thin membrane.

26. (Withdrawn) The method of claim 24 further comprising forming a second nonelastomer substrate over the thin membrane.

27. (Withdrawn) The method of claim 24 further comprising forming an active device in the first nonelastomer substrate, wherein the active device is an optical structure selected from the group consisting of a photodiode, a fiber optic device, a fiber optic interconnect, a light emitting diode, a laser diode, vertical cavity surface emitting laser (VCSEL), a micromirror, a CMOS imaging array, a CCD camera, a waveguide, and a source or a receiver for visible, infrared, or ultraviolet regions of the electromagnetic spectrum.

28. (Withdrawn) The method of claim 24 further comprising forming an active device in the first nonelastomer substrate, wherein the active device is an electronic structure selected from the group consisting of a resistor, a capacitor, a transistor, a chemical field effect transistor, a amperometric/coulometric electrochemical sensor, an accelerometer, a pressure sensor, a flow sensor, an electronic logic structure, a microprocessor, a chemical sensor, a strain gauge, an inductor, an actuator, a coil, a magnet, an electromagnet, a magnetic sensor, a

radio frequency source, a radio frequency receiver, a microwave frequency source, a microwave frequency receiver, a radioactive particle counter, and an electrometer.

29. (Withdrawn) The method of claim 24 further comprising forming an active device in the first nonelastomer substrate, wherein the active device is a thermal structure selected from the group consisting of a thermistor, a Peltier cooler, and a resistive heater.

30. (Withdrawn) The method of claim 24 wherein an active device is formed in the nonelastomer substrate by a technique selected from the group consisting of PCB technology, CMOS, surface micromachining, bulk micromachining, printable polymer electronics, Thin Film Transistor, and other amorphous/polycrystalline material techniques.

31. (Previously Presented) The composite structure of claim 5 wherein the channel has a width less than 500 microns.

REMARKS

Claims 1 – 5 and 31 have been examined. Claims 1 and 3 – 5 stand rejected under 35 U.S.C. §102(b) as anticipated by U.S. Pat. No. 4,848,722 ("Webster"); and Claims 2 and 31 stand rejected under 35 U.S.C. §103(a) as unpatentable over Webster in view of U.S. Pat. No. 5,932,799 ("Moles").

Claims 2 – 4 have been canceled and certain of their limitations incorporated into independent Claim 1. In addition, Claim 1 has been amended to recite that the flexible elastomer membrane is included as part of the layer overlying the nonelastomer substrate and forms a ceiling of the first recess. Support for this limitation can be found, for example, at p. 63, ll. 21 – 26 of the application.

The combination of limitations now recited in Claim 1 is neither taught nor suggested by Webster. In particular, it appears that the Office Action was relying on the embodiment of Figs. 5 and 5a of as disclosing the limitations of Claim 4, identifying void 41 as the "second recess" (it is noted that reference number 24 is a terminal point of passageway 20, Webster, Col. 6, ll. 8 – 9). Void 41 "is defined by a concave surface 43, which also may be spherical, formed in the surface 51 of the lower body portion 4 and the opposite side 53 of the flexible sheet" (Webster, Col. 7, ll. 31 – 34). This structure is different from what is now claimed, and examination of the claims as amended is accordingly requested.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 303-571-4000.

Respectfully submitted,

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